

INFORMATION REPORT

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SUBJECT Technical Examination of Soviet Nylon Stocking

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25X1 1. The stocking examined is described as follows:

- a. Visual examination identifies the item as a knitted, "full-fashioned" woman's stocking.
- b. Infra-red and X-ray measurements show the yarn to be a Nylon No. 6. Nylon No. 6 is identical with "Perlon L" which is currently made by several European producers.
- c. A small proportion of a crystalline substance tentatively identified as titanium dioxide was revealed by X-ray photographs.

2. Microscopic and optical examinations of the sample have revealed the following:

- a. The cross section of the nylon filament is round and fattened round.
- b. The longitudinal view of the filament shows that it is pigmented, apparently with titanium dioxide. A few longitudinal cracks were found. These cracks were reported as caused by the pigment which has a tendency to lie in lines parallel to the axis of the fiber.
- c. The filaments are strongly birefringent /having two indices of refraction; the difference between the greatest and least refractive index for light passing through the material being a measure of its birefringence. This property indicates that the filament is highly orientated /having its molecules ordered so that the majority point in one direction. The observed orientation is attributed to the effect of drawing the filaments after they had been extruded.

3. Physical properties of the nylon yarn were determined by tests to be as follows:

- a. The denier is 52. /Nine thousand meters of the yarn weigh 52 grams./
- b. The yarn consists of 12 filaments.
- c. The twist of the yarn is 5.5 turns per inch.

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- d. The tenacity in grams per denier was measured as follows:

<u>Dry</u>	<u>Knot</u>	<u>Wet</u>
4.78	4.17	4.25

- e. The per cent elongation at rupture load was measured as follows:

<u>Dry</u>	<u>Knot</u>	<u>Wet</u>
22%	19.2%	21.4%

4. The make-up of the stocking is evaluated as follows:

- a. The maker has knitted three courses of cotton, before transferring the welt from hooks to needles of the knitting machine, so that the transfer could be accomplished with cotton loops.
- b. The welt is too narrow and the number of fashioning courses is considerably less than is required to make a stocking of good shape, so that the upper leg is narrow while the ankle is wide.
- c. The heel tabs have been linked instead of having been run on the needles of the knitting machine.

5. Conclusions drawn from these observations are as follows:

- a. Tenacity and elongation values for the yarn are within the range for comparable USA [] nylon yarns.
- b. The denier is coarser than is usual in USA [] practice which would call for a yarn of not over 30 denier.
 - (1) Possibly the use of 52 denier yarn may indicate some lack of skill in yarn manufacture, processing, and knitting, since coarser yarns are easier to handle.
 - (2) Alternatively, 52 denier yarn may have been chosen to produce a very durable service-weight stocking less subject to "runs."
- c. Use of cotton starting courses indicate that apparently the maker has difficulty in transferring the welt when using nylon.
- d. If a 14 inch needle is assumed, it is deduced that a 45 gauge knitting machine was used to make the stocking.

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